The Veterinary Record, August 12th, 1961

Vet Med

Price 2s. 6d.

VETERINARY MEDICINE LIBRARY
SEP 6 1961

OHIO STATE UNIVERSITY
SEP 5 1961

The Veterinary Record

PATRON: HER MAJESTY THE QUEEN

Vol. 73 No. 32 Issue No. 4342 773-794

Registered as a Newspaper

JUNE

JULY

AUG

SEP

OCT

NOV

DEC

YOU WILL SOON BE NEEDING SHEEP BIOLOGICALS

NOW IS THE TIME TO STOCK UP WITH

PFIZER BLACK DISEASE VACCINE (Improved)
– the reliable way to prevent outbreaks of Black Disease in sheep.

PFIZER BLACK DISEASE ANTISERUM
– for the control of Black Disease in infected flocks and those in immediate danger.

Pfizer Limited now offer the veterinary profession a wide range of sheep biologicals through wholesalers. Ensure that your supplies are adequate for the vaccination months of September and October.

10129

Pfizer PFIZER LIMITED · SANDWICH · KENT

THE VETERINARY RECORD

Founded by William Hunting, F.R.C.V.S., in 1888

Volume 73
No. 32

SATURDAY, AUGUST 12th, 1961

7 Mansfield Street,
London, W.1.
Museum 6541

Field Trials of a Method for the Eradication of Foot-rot

BY

ANNIE I. LITTLEJOHN

Ministry of Agriculture, Fisheries and Food, Central Veterinary Laboratory, New Haw, Weybridge, Surrey

SUMMARY.—Field trials carried out in 1957 *involving* 1,477 *infected animals in* 15 *flocks in the south of England have shown that, using the principles established by Beveridge, it is possible to eradicate foot-rot from an ordinary commercial flock, with the simplest of handling facilities and using only* 10 *per cent. formalin as a medicament. General observations are made on the procedure adopted, and particular emphasis is placed on the importance of the adequate paring of the infected foot.*

Introduction

IN spite of the fact that Beveridge's (1938) classic work on foot-rot, which included all the information necessary for the eradication of this disease, was published over 20 years ago, there is no record of any attempt to apply this information to a commercial flock in this country, although it has been used successfully in Australia and New Zealand on numerous occasions (Beveridge, 1941; Filmer, 1955).

The eradication of foot-rot depends upon 3 well-established facts:—

(1) Foot-rot is a specific infectious disease affecting only the sheep and the goat.
(2) The causal organisms are incapable of surviving on pasture for more than a week (under Australian conditions).
(3) Provided the foot is thoroughly pared in such a way as to remove all underrun horn, the organisms are readily killed by any one of a variety of simple medicaments.

The ideal method of eradication although laborious is remarkably simple. The infected animals are identified, treated and isolated, forming a "hospital group." They are examined and retreated where necessary at weekly intervals until all appear to have been cured. The healthy sheep are placed on clean land (*i.e.* land that has been rested from sheep for at least one week) and a close watch is kept upon them, any lame animals being immediately transferred to the hospital group. Not less than a month after the last infected animal appears to have been cured, the whole hospital flock is re-examined. If no infected foot is found, it is considered that the disease has been eradicated.

Although this method, involving the isolation of infected sheep and the use of clean pastures, is presumably not only practical but almost essential in the very large flocks found in Australia it would not be suitable for the average flock in this country, the main reason being that on the type of farm where foot-rot is commonest, the flock is usually comparatively small, and is pastured as a single group. Particularly as sheep are seldom the main enterprise on farms of this type, neither pasture nor labour would be available for maintaining the flock in two parts for a period of at least, and probably much more than, a month.

When, therefore, in the spring of 1957, an opportunity presented itself of carrying out field trials in the control of foot-rot, it was decided to modify Beveridge's method to make it practicable under ordinary British farming conditions. The flocks were selected on the basis of high and presistent incidence of infection and willingness of the owner to co-operate. A description of the method to be used was supplied to each flockmaster well in advance and as this method was found to require no further modification, it is convenient to reproduce the description verbatim, as follows:—

Foot-rot Eradication Trials 1957

Object

To determine whether foot-rot can be eradicated from a flock under ordinary British farming conditions and whether, provided no fresh infection is introduced, the flock will remain free from the disease indefinitely.

Equipment and facilities

1. Usual set of folds, with a foot-bath (capable of holding at least 2 sheep at a time) leading directly into a pen with a hard, dry floor, such as concrete or asphalt, or a pen containing a deep bed of dry straw.

TABLE I

Flock	County	Breed	System of husbandry	Shepherding	Flooring of holding pen	Treatment of original group				Treatment of infected purchased sheep		Final clear *ex* of whole flock	Total number of visits
						Begun	Ended	Length of time	Number of visits	Begun	Ended		
1	I.O.W.	Clun	Ranging on down	Full-time shepherd	Macadam road	2. 5.57	26. 7.57	12 weeks	4	27.8.57	30. 9.57	Omitted (in lamb)	5
2	Berks	Crossbred	Leys	,,	Straw	30. 4.57	24. 7.57	12 ,,	5	—	—	5. 9.58	7
3	Oxon	Suffolk and crossbred	Leys and parkland	,,	Farm road	6. 5.57	22. 7.57	11 ,,	4	—	—	Omitted (in lamb)	9
4*	Sussex	Clun	Leys and parkland	,,	Concrete	A22. 5.57 B 8.11.57	29. 7.57 31. 1.58	10 ,, 12 ,,	4 7	—	—	,,	11
5	Sussex	Welsh and crossbred	Leys	Owner	,,	27. 5.57	25. 7.57	8 ,,	3	—	—	1.11.57	4
6	Herts	Clun and halfbred	Leys and parkland	Full-time shepherd	,,	30. 5.57	30. 7.57	9 ,,	5	—	—	26.11.57	7
7	Herts	Crossbred	Leys	Owner	,,	18. 6.57	30. 9.57	15 ,,	7	—	—	19.11.57	8
8	Surrey	Kent, Suffolk and crossbred	,,	,,	Straw	22. 8.57	5.11.57	11 ,,	7	—	—	Omitted (in lamb)	7
		Kerry Hill	,,	,,	,,	6. 9.57	27. 9.57	3 ,,	3	—	—	Omitted (in lamb)	3
9	Wilts	,,	,,	,,	Concrete	27. 8.57	17. 9.57	7 ,,	4	25. 9.57	11.10.57	12.12.57	8
10	Wilts	Crossbred and halfbred	Leys and down	,,	,,	2. 9.57	3.10.57	4½ ,,	4	—	—	6.11.57	5
11	Hants	Crossbred	Leys	,,	Straw	18. 9.57	11.10.57	3½ ,,	4	11.10.57	15.10.57	Omitted (in lamb)	7
12	Wilts	Hampshire	Folded	Full-time shepherd	,,	19. 9.57	10.10.57	3 ,,	4	—	—	Omitted (in lamb)	4
		Crossbred and Exmoor	Leys and down	,,	,,	16.10.57	7.11.57	3 ,,	4	—	—	,,	4
13	Wilts	Hampshire and halfbred	Folded and down	,,	,,	23. 9.57	6.11.57	6 ,,	7	—	—	,,	7
14	Surrey	Halfbred and cross-Suffolk	Parkland	Part-time shepherd	,,	23.10.57	9.12.57	7 ,,	8	—	—	,,	10
15	Surrey	Crossbred	Leys	Owner	,,	24.10.57	7. 3.58†	18 ,, †	9	—	—	,,	9

* Owing to a change in the management of the flock, the final inspection after the visit of 29.7.57 had to be omitted. As the disease had spread considerably by the time of the next visit, and as new sheep had been introduced, a fresh trial was considered to have begun on 8.11.57.

† Ought to have been examined in mid-January, but visit had to be postponed on account of foot-and-mouth disease restrictions.

2. Strong brush for keeping the above-mentioned floor clean, or a good supply of dry straw.
3. Paint or marking fluid (not grease stick) for marking infected sheep.
4. Formalin (*i.e.*, a 40 per cent. solution of formaldehyde) used in foot-bath in the proportion of 1 part of formalin to 9 parts of water, *i.e.*, as a 10 per cent. solution.
5. Enough water to fill and top up the foot-bath. There is a considerable wastage from the portable type of foot-bath that is placed on the surface of the ground, as opposed to the permanent type sunk into the ground.
6. Small tin for dipping individual feet.

Labour

Each skilled operator (*i.e.*, one capable of paring an infected foot thoroughly, but without causing injury to the sensitive flesh) should have an unskilled assistant to catch, hold and dispose of the sheep. Another man (or boy) is required to control the rate of passage of the sheep through the foot-bath. If possible there should be another man to keep the catching pen full, top up the foot-bath, keep the draining pen swept clean, etc., to avoid loss of skilled time.

With adequate assistance as above 2 skilled operators can deal with about 200 sheep in a day, although obviously this number depends largely on the amount of infection present. A healthy sheep can be examined in a matter of seconds, whereas a badly infected foot may require as much as 15 minutes.

Procedure

1st visit. Every sheep is turned up and every foot examined. Infected feet are carefully pared and then immersed for 60 seconds in a 10 per cent. solution of formalin contained in the small tin. After being given a temporary distinguishing mark with paint, etc., the sheep goes slowly through the foot-bath, which also contains a 10 per cent. solution of formalin, and stands for at least an hour on a clean, dry floor before being returned to pasture. If clean* land is available, the flock should go on to it. If not,

* Clean land—pasture that has been rested from sheep for at least 1 week in dry weather, or 3 weeks if the weather has been wet.

TABLE II (*continued on page 776*)

INCIDENCE OF INFECTION

Breed	Ewes					Lambs				
	Number in flock	Number of animals infected	Percentage infected	Number of feet infected	Feet infected per animal	Number in flock	Number of animals infected	Percentage infected	Number of feet infected	Feet infected per animal
1. Clun	180	66	36·7	98	1·5	360	148	41·1	215	1·5
2. Crossbred	169	79	47·0	94	1·2	157	39	24·8	48	1·2
3. Suffolk and crossbred	142	38	26·8	48	1·3	212	25	11·8	26	1·0
4. Clun ... ... A	244	57	23·4	67	1·2	387	1	0·3	2	2·0
B	270	45	16·7	45	1·0	—	—	—	—	—
5. Welsh and crossbred...	255	29	11·4	29	1·0	397	10	2·8	10	1·0
6. Clun and crossbred ...	236	44	14·4	46	1·0	346	7	2·0	7	1·0
7. Crossbred	68	30	44·1	31	1·0	84	11	13·1	12	1·1
8. Kent, Suffolk and crossbred	176	18	12·3	18	1·0	130	3	2·3	3	1·0
Kerry Hill	90	52	57·8	67	1·3	—	—	—	—	—
9. Kerry Hill	323	9	2·8	10	1·1	150	5	3·3	5	1·0
10. Crossbred and halfbred	268	23	8·6	24	1·0	116	3	2·6	3	1·0
11. Crossbred	185	31	16·8	32	1·0	—	—	—	—	—
12. Hampshire	161	37	23·0	37*	1·0	—	—	—	—	—
Crossbred and Exmoor	187	33	17·6	40	1·2	—	—	—	—	—
13. Hampshire and halfbred	325	150	46·2	173	1·2	230	112	48·7	154†	1·4
14. Halfbred and Cross Suffolk	79	55	69·6	83	1·5	2	2	100·0	2	1·0
15. Crossbred	245	172	70·2	217	1·3	—	—	—	—	—
Total ...	3,603	978	27·1	1,159	1·2	2,571	366	14·2	487	1·3

* 18 of these feet were treated on the first occasion with a proprietary preparation and therefore do not appear in Table V.
† 91 " " " " " " " " " " " " " " "

TABLE II (*concluded*)

Breed	Yearlings					Rams				
	Number in flock	Number of animals infected	Per centage infected	Number of feet infected	Feet infected per animal	Number in flock	Number of animals infected	Per centage infected	Number of feet infected	Feet infected per animal
1. Clun	108	39	36·1	43	1·1	4	2	50·0	3	1·5
2. Crossbred	—	—	—	—	—	3	—	—	—	—
3. Suffolk and crossbred	—	—	—	—	—	4	2	50·0	3	1·5
4. Clun ... ... A	100	6	6·0	6	1·0	12	3	25·0	6	2·0
B	95	15	15·8	17	1·1	—	Included amongst ewes			
5. Welsh and crossbred...	50	—	—	—	—	4	1	25·0	2	2·0
6. Clun and crossbred ...	4	2	50·0	2	1·0	6	—	—	—	—
7. Crossbred	—	—	—	—	—	1	—	—	—	—
8. Kent, Suffolk and cross-bred	—	—	—	—	—	4	—	—	—	—
Kerry Hill	—	—	—	—	—	—	—	—	—	—
9. Kerry Hill	—	—	—	—	—	8	—	—	—	—
10. Crossbred and halfbred	—	—	—	—	—	5	—	—	—	—
11. Crossbred	60	3	5·0	3	1·0	4	4	100	8	2·0
12. Hampshire crossbred and Exmoor ...	60	20	33·3	21	1·1	2	—	—	—	—
13. Hampshire and halfbred	21	5	23·8	7	1·4	—	—	—	—	—
14. Halfbred and cross Suffolk	—	—	—	—	—	3	2	66·7	4	2·0
15. Crossbred	54	29	53·7	32	1·1	Included amongst ewes				
Total ...	552	119	21·6	131	1·1	60	14	23·3	26	1·9

they simply return to the pasture from which they have come. Infected sheep need not be separated from healthy sheep at this stage.

Healthy sheep also go slowly through the foot-bath and stand on the dry floor for an hour.

2nd visit (5 to 7 days later). A repetition of the first, but it requires much less time, since the majority (usually 80 to 90 per cent.) of the infected sheep will have been cured and require only to be examined.

Any feet still infected and any new cases are, of course, pared and treated as at the first visit.

3rd visit (5 to 7 days later). Only the sheep marked as having been infected (at either the first or the second visit) are turned up and examined. The whole flock, however, goes through the foot-bath and stands on a dry floor for an hour as before.

4th visit (5 to 7 days later). A repetition of the third visit.

By now, the flock should be nearly free from infection. The few animals still infected, or lame from some other cause, should now be separated from the rest and examined and, if necessary, treated at intervals of a few days until they are free from infection (or disposed of as being permanently lame).

Final visit. At least a month after the last infected sheep has been cured or disposed of, the whole flock is turned up and the feet examined carefully. If no infection is found, it may be assumed that the disease has been eradicated.

Quarantine of purchased animals

All sheep bought in after the disease has been eradicated must be isolated until they have been cleared of infection by the procedure outlined above.

Results

The type of flock, method of husbandry, etc., are shown in Table I, the incidence of infection found to exist at the first examination in Tables II and III and the results of treatment in Tables IV and V.

Eradication was successfully carried out in all but one of the flocks (No. 13). It should be mentioned that in this flock the final examination had to be omitted on account of foot-and-mouth disease restrictions. It was reported by the owner that all the sheep were going sound at the time at which they ought to have been re-examined and continued to go sound for another month or so. Lameness was said to have reappeared in February, 1958, but was not reported to the writer until April, by which time a high proportion of the flock was infected.

All the other flocks remained free from infection until the autumn of 1958, when the trial was dis-

TABLE III
SUMMARY OF INCIDENCE OF FOOT-ROT IN PARTICIPATING FLOCKS

	Total number of animals	Number of animals infected	Percentage infected	Number of feet infected	Number of feet infected per animal
Ewes ...	3,603	978	27·1	1,159	1·2
Lambs...	2,571	366	14·2	487	1·3
Yearlings	552	119	21·6	131	1·1
Rams ...	60	14	23·3	26	1·9
Total	6,786	1,477	21·8	1,803	1·2

continued, as it would have been impossible to ascertain whether any cases occurring after that time were the result of recrudescence of infection or the inclusion of infected sheep amongst the replacements ordinarily purchased in the autumn. Eight of the flocks, however, were reported by the owners still to be free from foot-rot in the summer of 1959 and 2 of these are known still to be free from foot-rot at the time of writing (summer, 1960). Of the other 6 flocks, 2 were reported to be infected again by the summer of 1959. The remaining 4 owners did not reply to inquiries made in 1959.

Clinical Notes

Choice of medicament

As formalin has been used in Australia and New Zealand for many years with good results (Beveridge, 1941) and had already been used by the writer to eradicate foot-rot from several non-commercial flocks, including those at Weybridge* and Frant (Littlejohn, 1955; 1956), it was the obvious choice for these trials. It is comparatively cheap, readily available to farmers, easily disposed of (unlike the highly poisonous preparations containing copper or arsenic); does not stain the wool and is no less efficient in curing foot-rot than any of the other commonly used agents available in 1957, including the expensive antibiotic chloramphenicol (Filmer, 1955; Green, 1955). It also has a most desirable astringent effect on the pared foot, but (again unlike copper sulphate) it does not harden normal horny tissue. Its one important disadvantage is the irritant vapour given off by it, particularly in warm weather. This vapour is well known to be capable of producing serious effects in an enclosed space, but as foot-baths are almost invariably used in the open air in this country, the danger to health is negligible.

General Notes on Treatment

A mere description of the correct method of paring an infected foot, even one uncomplicated by the presence of granulation tissue or anatomical abnormality, is of little value. The only way of gaining such knowledge is by experience, and here it should be pointed out that remarkably few farmers, or even shepherds, know what efficient paring means. All too many have no criterion other than the drawing of blood. It cannot be too strongly emphasised that it is not only possible, but highly desirable, to expose all infected tissue without causing more than minor oozing of blood. Excessive haemorrhage not only indicates that unnecessary damage has been caused to the healthy part of the foot but makes it difficult to see what one is doing, and therefore usually results in inefficient paring.

It is essential for the maintenance of a high standard of speed and efficiency that unskilled assistance should be available for catching and holding the sheep. It is impossible to pare an infected hind foot properly while holding the sheep oneself. Various types of cradle for holding sheep are now available in this country (or can be made by the farmer himself from wood and sacking), but the writer has had only limited experience of their use.

The individual dipping of infected feet in a small container immediately after paring and before the sheep is put through a foot-bath containing exactly the same solution, is necessary in view of the fact that the animal will usually try to carry the freshly pared foot which, therefore, may not be immersed in the formalin in the foot-bath at all.

As all sheep go through the foot-bath each time the flock is mustered for examination, there is no need to disinfect one's hands and instruments after examining each sheep, but it is only wise to take elementary precautions after paring a badly infected foot. The practice, often noticed amongst shepherds, of wiping the knife clean on the sheep's fleece, is to be deprecated, since such infected material will obviously not be rendered harmless by the passage of the animal through the foot-bath, and for the same reason pieces of infected hoof should not be left lying on the floor of the pen where they will adhere to the fleece of the next sheep to be "turned up" in that particular place. Owing to the strongly astringent action of formalin, a properly pared foot will harden with remarkable rapidity, particularly if the weather is dry, and the animal may be taking weight on the foot within 48 hours. When only one foot is affected, little inconvenience is caused by thorough paring as the animal will usually be able to protect the exposed tissue from injury by going on 3 legs for the necessary period of time. When, however, 2 or more feet are affected, particularly if both forefeet are involved, one must exercise discretion in the amount of paring to be undertaken at the first visit. Ideally, all feet should be pared to whatever extent is necessary and the animal kept in on a dry bed for 2 or 3 days, *i.e.* until the feet have hardened, but if such individual attention is not practicable, one must be careful to leave the animal enough horny tissue to bear its weight on at least 3 feet and advise the owner not to over-drive the flock for the next few days. As such incompletely pared feet are unlikely to heal, they must receive special attention at the next examination.

It is hardly necesary to point out that, as the causal organisms of foot-rot are anaerobic, any form of covering, such as a bandage or a boot, is contra-indicated.

*Foot-rot was eradicated in 1956 from all the various small flocks (totalling about 300 animals) maintained at this laboratory and in spite of the frequent purchase of infected sheep, these flocks have remained free from infection thanks to the routine laboratory quarantine precautions.

TABLE IV
RESULTS OF TREATMENT

Flock	Ewes										Lambs			
	Number of feet infected	Still infected at second visit	Percentage cured after first treatment	Still infected at third visit	Still infected at fourth visit	Still infected at fifth visit	Still infected at sixth visit	Still infected at seventh visit	Still infected at eighth visit	Still infected at ninth visit	Number of feet infected	Still infected at second visit	Percentage cured after first treatment	Still infected at third visit
1	98	13+*5*	86·7	4+*1*	—						215	35+*6*	83·7	9
2	94	14+*5*	85·1	8+*3*	5	2	2	–+*2*	—		48	13	72·9	4+*1*
3	48	7+*1*	85·4	2	1+*1*	2	—				26	5	80·8	1
4A	67	21+*6*	68·7	8	1	—					2	–+*4*	100·0	1
B	45	5	88·9	2	2	1	1+*1*	2	1	—	10	—	100·0	—
5	29	1	96·6	1	—									
6	46	4+*1*	91·3	1+*1*	1	1+*3*	2	—			7	1+*6*	85·7	1+*1*
7	31	2+*1*	93·5	2+*4*	6	1	—				12	3	75·0	1
8	18	1+*1*	94·4	1	—	1+*6*	—				3	—	100·0	
	67	1+*2*	98·5	—										
9	10	1+*1*	90·0	1	—						5	1	80·0	
10	24	1+*1*	95·8	—							3	—	100·0	
11	32	1	96·9	1	—									
12	19	1	94·7	—										
	40	1+*1*	97·5	—										
13	173	14	91·7	3	—						63	9	85·7	1+*1*
14	83	2+*2*	97·6	1	–+*1*	–+*1*	—				2	—	100·0	
15	217	34+*20*	88·9	8	3	3+*3*	1	—						
Total	1,141	124+*47*	89·1	43+*9*	19+*2*	11+*13*	6+*1*	2+*2*	1	—	396	67+*16*	83·0	18+*3*

Note.—Numbers shown in italics represent a few fresh cases of infection from within the flock but mainly established infections that must have found at the 5th visit were the result of

Instruments

A combination of secateurs for the removal of most of the overgrown and/or separated horn and a small, sharp, narrow-bladed knife for the final stages of treatment has been found by the writer to be the most effective.

The secateurs (a suitable make is now available in this country) should have strong, straight-sided tapering blades and a return spring. Most of the foot knives on the market are suitable for only the routine removal of overgrown horn from healthy feet and are too large and clumsy for the fine paring necessary in an infected foot. An ordinary single-bladed penknife may be adapted for this purpose by inserting a strip of metal or wood about 1½ inches wide into the space occupied by the blade when folded and binding it into position with twine, thus forming a comfortable handle (the handle of a small penknife is too narrow to grasp easily, particularly if rubber gloves are worn).

In New Zealand, where a large-scale eradication trial is in progress (Ensor, 1957a, 1957b), a single instrument combining the action of secateurs and knife is in use (Bouvard, 1958) and is said to result in a considerable saving of time. It is of Swedish manufacture and appears not to be available in this country.

Optimum time of year for eradication

Although it may be seen from the results above that eradication can be carried out at any time other than the lambing season, the best time of year for undertaking eradication is early autumn, when the flock is at its lowest number, the lambs having been sold, or at least weaned preparatory to being sold, and the flock replacements, if any, not yet purchased. Any ewes found to be difficult to cure may be disposed of as culls in the ordinary way, without undue loss of value. At this time of year, there is also a reasonable prospect of dry weather, and extra labour is usually available after the end of harvest.

For practical reasons, some of these trials had to be started early in the year and it is noticeable that eradication was achieved more rapidly, *i.e.*, with fewer visits, in flocks in which the programme was begun in autumn than in those in which work began in late spring and summer (Table I).

TABLE IV—*continued*

Lambs				Yearlings					Rams				
Still infected at fourth visit	Still infected at fifth visit	Still infected at sixth visit	Still infected at seventh visit	Number of feet infected	Still infected at second visit	Percentage cured after first treatment	Still infected at third visit	Still infected at fourth visit	Number of feet infected	Still infected at second visit	Percentage cured after first treatment	Still infected at third visit	Still infected at fourth visit
4	2	2	—	43	5	88·4	2	—	3	1	66·7	—	
4	2	1	—										
—									3	1	66·7	1	—
—				6	1	83·3	1+*1*	—	6	1	83·3	—	
				17	2	88·2	—		2	—	100·0		
1+*1*	1	—		2	—	100·0							
—													
				3	—	100·0			8	—	100·0		
				21	—	100·0							
				7	—	100·0			4	—	100·0		
				32	4	87·5							
9+*1*	5	3	—	131	12	90·8	3+*1*	—	26	3	88·5	1	—

gone undetected at the first examination, except in Flock No. 8, in which there was strong circumstantial evidence that the six fresh cases infection introduced by two straying lambs.

Economics

On the assumption that the skilled work would normally be carried out by the owner or his shepherd, the cost of eradication for skilled labour and formalin alone was estimated at between 1s. 7d. and 3s. 3d. per sheep. Unskilled labour would have to be provided in addition, at the rate of one unskilled to each skilled operator. The cost of eradication is therefore considerable, but it must be remembered that, if quarantine restrictions are properly observed when flock replacements are purchased, the expense will not recur in subsequent years.

The only figures available regarding the losses caused by this disease appear to be those given by Hunt (1958) who found that, in lambs fattening on roots, the loss of carcase value caused by foot-rot, in spite of treatment, amounted to 9s. 4d. per head over a period of 8½ weeks. It is, however, common knowledge that lame ewes are less likely to milk well than are sound ones and that lame lambs do not thrive. It may also be mentioned that several of the farmers participating in the above trials stated that they would be willing to pay 10s. to 20s. extra for young female flock replacements guaranteed to be free from foot-rot.

Discussion

It should be pointed out that the incidence of foot-rot in the flocks participating in these trials is probably higher than the average in lowland flocks and is, of course, much higher than the national average, since foot-rot is comparatively rare in hill sheep, which represent some 45 per cent. of the total sheep population of Great Britain. It should be noted, however, that the highest incidence of infection encountered in these trials was in the group of adult Kerry Hill ewes purchased from the Welsh border area during the course of the trial by the owner of Flock 8. Fifty-two (57.8 per cent.) of the 90 animals were found to be infected (Table II).

For practical reasons it was necessary in the larger flocks to allow the owner or shepherd to assist in the detection of infection during the first examination, the author's time being spent mainly in the treatment of the infected feet during this visit. This may account for the rather large number of established cases detected only at the second visit, by which time, owing to the great reduction in the number of cases requiring treatment, it had become possible for the author personally to examine every sheep in the flock (Table IV).

TABLE V
SUMMARY OF RESULTS OBTAINED AFTER A SINGLE TREATMENT WITH 10 PER CENT. FORMALIN

	Number of infected feet	Still infected after first treatment	Percentage apparently cured
Ewes ...	1,141*	124	89·1
Lambs ...	396*	67	83·0
Yearlings ...	131	12	90·8
Rams ...	26	3	88·5
Total	1,694	206	87·8

* See footnote to Table II.

The proportion of cures (87.8 per cent.) resulting from a single treatment with 10 per cent. formalin is probably not the maximum obtainable, since these trials were carried out mainly in the rather wet summer of 1957. Although formalin was found to be highly satisfactory it must be pointed out that the preparation of the foot is more important than the agent used in the foot-bath. It may not be generally realised that careful paring alone is sufficient to cure a large proportion of infected feet (Hart *et al.*, 1957). The curative effect of such paring will obviously be enhanced by dry weather. This point should be borne in mind when assessing the value of the various proprietary agents now on the market. It is also to be remembered that as some of these, including chloramphenicol, are incompatible with formalin, their use is contra-indicated where flock eradication based on the use of the formalin foot-bath is contemplated, since infected animals treated with one of these agents would then have to by-pass the foot-bath used for the rest of the flock.

It has been proved by these trials that foot-rot can be eradicated under a variety of conditions, using only the simplest of handling facilities (a catching pen, a foot-bath and a pen with a dry floor), and without either the provision of "clean" pastures, or the isolation of the infected animals (except possibly in the later stages, for the sake of convenience). The major obstacles to eradication are the general lack of knowledge amongst flock-owners of what constitutes a properly pared foot and their failure to appreciate the necessity for examining every member of the flock, whether lame or not.

The eradication of foot-rot from a self-contained flock is within the capability of any owner, and such a flock will remain free from the disease for an indefinite period, providing the elementary precaution is taken of ensuring that the necessarily purchased rams have well-shaped, healthy feet and are put through the foot-bath immediately upon arrival (to destroy any organisms that may have been picked up in the sale-ring or in transit).

Where regular drafts of young female breeding stock must be purchased (*e.g.* in a flock of half-bred ewes) the maintenance of freedom from foot-rot is naturally more difficult, but as flocks of this type often obtain their young stock from hill areas, where foot-rot is rare or even unknown, and as foot-rot is easily treated in young sheep, the danger of re-introduction of the disease is not great. If on careful individual examination the replacements are all found to have healthy feet, they need only be walked through the foot-bath before joining the rest of the flock. If, however, even one of them is found to have any sign of foot-rot, the whole group should be kept in isolation until at least a month after the last infected foot has been cured.

In flocks where adult replacements are purchased, the maintenance of freedom from foot-rot calls for more stringent quarantine precautions, since the existence of carriers—sheep not necessarily lame, but having a pocket of infection in an (often deformed) foot—may delay the eradication of the disease from the purchased group. As adult replacements are ordinarily purchased only shortly before the start of mating, the owner may be tempted to reduce the quarantine period and may so allow one of these carriers to pass into the main flock.

In flying flocks, the problem of eradication would obviously arise each year, and it is unlikely that under present conditions many owners would consider it worth attempting although, in certain seasons, the economic loss from foot-rot must be very considerable.

As long as the control of foot-rot remains the responsibility of the individual owner, there is little hope of eradicating it from this country. This, however, need not deter the progressive farmer from attempting to eradicate the disease from his own flock. Once the initial effort has been made, the amount of work necessary to ensure that the flock remains free from infection is very small in proportion to the benefits that may be expected from an almost complete elimination of lameness.

Acknowledgments.—I wish to express my appreciation of the encouragement given by Dr. A. W. Stableforth throughout the course of this work, and to offer my thanks to the Divisional Veterinary Officers and the Livestock Husbandry Officers of the counties concerned for suggesting suitable flocks, and to the owners of these flocks and their shepherds for their enthusiastic co-operation in these trials.

References

BEVERIDGE, W. I. B. (1938). *J. Coun. Sci. industr. Res. Aust.* **11.** 1-20.

———. (1941). Bull. Coun. Sci. industr. Res. Aust. No. 140. P. 1.

BOUVARD, H. (1958). Personal communication.

ENSOR, C. R. (1957a). *N.Z. J. Agric.* **94.** 218.

——. (1957b). *Ibid.* **94.** 559.

FILMER, J. F. (1955). N.Z. Dep. Agric. Animal Res. Rev. Bull. No. 383. p. 14.

GREEN, R. J. (1955). *Tasman. J. Agric.* **16.** 10.

HART, C. B., MALONE, J. C., & SPARROW, W. B. (1957). *Vet. Rec.* **69.** 724.

HUNT, T. E. (1958). *Agriculture.* **64.** 561.

LITTLEJOHN, ANNIE I. (1955). *Vet. Rec.* **67.** 599.

———. (1956). Unpublished work.

Hygiene in Slaughterhouses*

BY

J. NORVAL

Chief Veterinary Inspector, Edinburgh Corporation

THE purpose of maintaining a high standard of slaugnterhouse hygiene is twofold: to prevent food poisoning and to prevent gross contamination of carcase meat and offal so as to prolong their keeping quality. Both aspects are very important and, although it is quite impossible to assess the loss to the meat trade through the decomposition of meat, it is possible to form a picture of food poisoning by a study of statistics published by the Laboratory Service of the Ministry of Health. In England and Wales, food poisoning has been a notifiable disease for many years and from 1944 onwards there has been a marked increase in incidents. The Ministry Report on Food Poisoning for 1957 indicates that there were 7,071 incidents involving 15,100 persons, and of this number 36 cases ended fatally. The bacteria responsible were mainly (1) *Salmonellae*, (2) *Staphylococci* and (3) *Clostridium welchii*, with a very occasional outbreak associated with other organisms, *e.g. Bacterium proteus, Bact. coli*, etc. *Salmonellae* were responsible for 95 per cent. of food poisoning incidents, due to recognised pathogens, *Staphylococci* for 3 per cent. and *Cl. welchii* were incriminated in 2 per cent. In the larger outbreaks *Salmonellae* were responsible for 44 per cent., *Staphylococci* for 20 per cent. and *Cl. welchii* for 29 per cent. In my experience in Edinburgh, *Cl. welchii* is particularly important in outbreaks associated with feeding in canteens, restaurants, etc. The report also shows that in 200 general and family outbreaks, meat and meat products were the vehicle of infection in 145 of them, and if all incidents involving *Salmonellae* are considered then they were incriminated in half of them. Nearly two-thirds of these meat products were pork dishes. The *Salmonellae* may gain access to the meat at any stage from the slaughterhouse to the table, but as far as this paper is concerned the sources in the slaughterhouse alone will be discussed.

With regard to spoilage of meat and the formation of slime, it is generally considered that this is a problem of surface contamination of meat and only in advanced cases does the deeper part of the flesh carry large numbers of bacteria. Various estimates have been made of the number of bacteria found on the surface before slime becomes obvious and they vary from 32 to 50 million per sq. cm. The organisms are chiefly of the *Achromobacter* and *Proteus* type and growth takes place even when carcases are held at 32° F. or just above. Most of the scientific work on surface contamination of meat has been carried out by Australian workers to assist the Australian Meat Exporters to compete with the Argentine producers. They found that, with care, the level of surface contamination could be reduced to the low level of 1,000 low temperature micro-organisms per square inch of carcase surface.

The prevention of surface contamination and, if the infected animal is excluded, the prevention of *Salmonella* infection can be dealt with by the same principles and the following is an outline of the precautions necessary to prevent both.

Lairage

The largest outbreak of *Salmonella* food poisoning in recent years associated with meat products occurred in Sweden in 1953 when there were 7,713 notified cases with 90 deaths. Because of a slaughterhouse strike, there was an accumulation of animals in slaughterhouse lairages and, when work was resumed, there were added the difficulties of cold storage breakdown and very hot weather.

McDonagh and Smith found in 1954/55 in Bradford that rectal swabs taken from pigs soon after arrival in the abattoir showed that 2.9 per cent. of them were excreting *Salmonellae*, but after 1/7 days or longer in the lairage, 13.5 per cent. were harbouring the infection. McDonagh and Smith also found a close relationship between abattoir findings and human *Salmonella* infection in Bradford during this period. Galton, Smith, McElrath and Hardy (1954) found in Florida, U.S.A., that 23 per cent. of fresh sausage and 12.5 per cent. of smoked sausage contained *Salmonellae*. On investigating pigs on farms they found the degree of infection was very slight but examination of pigs in lairages awaiting slaughter revealed that about 78 per cent. were infected. Seventy-five per cent. lairage drinking water sampled and 51 per cent. of samples from the paddles of the pig scraping machines, were also infected. In Northern Ireland, Newall, McClair, and Murdock recovered *Salmonellae* from 3 per cent. of meat samples and 70 per cent. sausage samples prepared from pigs which showed infection prior to slaughter. These recent findings emphasise the importance of preventing overcrowding of animals in lairages and keeping them under strict hygienic conditions. In addition the Australian workers found that at least 33 per cent. of the organisms found on the surface of ox carcases originated from their skin and feet. In very large abattoirs it is possible to wash the animals immediately prior to slaughter but, in this country, as far as I am aware, there are no such installations. Reliance must, therefore, be placed on keeping the lairages clean and well bedded. Straw is the best material but it is now very expensive. In Edinburgh, however, we are fortunate in that we have very good sales for the manure from the slaughterhouse. Other materials, such as sawdust

* Paper presented to the meeting of the Association of Veterinary Food Hygienists at Stirling on January 11th, 1961.

and peat moss, tend to result in choked drains, and wood shavings lower the manurial value of the dung. The lairage must be well constructed with impervious floors and pen division may be either by tubular metal or of cement. Personally, I prefer tubular metal as it is much easier to do *ante-mortem* inspection. Properly constructed byres are useful for tying up cows and result in a great saving of straw. In a recent outbreak of foot-and-mouth disease, several slaughterhouses became involved and the risk of this occurring is increased if animals are allowed to remain there too long. If dealers have overbought and the price of meat falls, they prefer to keep the animals alive in the lairage until the price rises. Slaughterhouse by-laws do stipulate a maximum period in which animals can stay in the lairages but, if proper chilling facilities were available at all abattoirs, then it would be possible to reduce this waiting period without causing undue hardship to the owner of the cattle.

While discussing this question of accumulation of animals I would just like to point out that there is a growing practice for dealers to purchase live animals in fat markets and allow them to remain there for a few days before removal to the slaughterhouse. As those animals are not owned by the Market Companies there is often inadequate feeding and bedding and, in my view, this practice should be discouraged, *i.e.* markets are intended for "temporary visitors" not "permanent residents."

A sharp increase in the incidence of salmonellosis in calves has been reported by the V.I.O. service in Scotland and efforts should be directed to the prevention of stress in these young animals, *e.g.* by providing heated pens in the market and by slaughtering as soon as they reach the slaughterhouse.

Bleeding

The collection and stirring of blood in abattoirs in this country leaves much to be desired, from the hygiene point of view. With the development of the modified line system for cattle, I should like to see them being bled from a bleeding rail in a separate room and the blood from each animal stirred on its own by a mechanical stirrer. This would prevent contamination and would not require the operator to handle the blood in any way. It would be an advantage to cool the blood before leaving the abattoir, although in a large number of cases the black puddings are made daily on receipt of fresh blood from the slaughterhouse. The cans brought by the butchers to the slaughterhouse must be examined and any found rusty or evil smelling rejected. The equipment used for the collection and stirring of blood must be sterilised frequently, either in boiling water or by steaming.

Dressing

When handling the feet and hide of cattle and sheep the slaughterman's hands become very dirty and, in my experience, this dirt is allowed to wear off gradually on the inside of the hide or on the subcutaneous tissue whichever is unfortunate enough to receive it. As the slaughterman works on piecework and time is exceedingly valuable, it is essential, therefore, in order to check this source of infection that adequate washing facilities must be close at hand for the slaughterman to wash his hands. In the present rope-and-ring method of securing, this is very difficult, but with the introduction of line system it is comparatively easy to arrange. This contamination of the subcutaneous tissue is seen at its worst when fat sheep are consigned from very wet turnip fields and, in those cases, even with great care and skill on the part of the slaughterman, it is most difficult to prevent contamination.

There are no hygiene regulations in force in Scotland at the present time and in a paper of this length it is not possible to discuss structural requirements of the slaughterhouse but the Hygiene Regulations which are in force in England lay down standards which, in my opinion, are adequate for the purpose.

There are only a few abattoirs in this country with a sufficiently large through-put to justify the installation of a full line but the number of modified lines for cattle will probably increase although, at the moment, their popularity is doubtful. There is no question that in the line system the abattoir floors can be kept in a cleaner condition and, as the slaughtermen can have washing facilities close at hand, their hands and equipment can be kept cleaner. The line system for sheep has not proved popular but the bleeding from an overhead rail and the collection of blood in the containers does keep the floor cleaner than the traditional method. The carcases are dropped from these bleeding rails and dressing completed on stools. The use of skid hooks on rails in sheep halls is a great advance on the method of carrying dressed sheep from the disembowelling hook to a fixed hook on the wall for setting. The clothing of the slaughtermen in the shoulder area soon becomes soaked with water and blood and, after a few days, this must be a source of heavy infection on the outside of the sheep carcase.

Pigs are usually skinned on the floor but the skin is left attached by the tail and nose until the pig has been weighed and graded. If the weighing scale is some distance from the killing area, the subcutaneous tissue is liable to be heavily contaminated from this suspended skin during its journey along the skid rail. Similarly, when pigs are being dressed by scalding, the scalding tank water soon becomes very dirty and leads to gross contamination of the skin. In some countries the lungs from scalded pigs are not utilised for human food. The frequent emptying of the tank is recommended but as it is very large, the time factor in refilling again raises difficulties. In Edinburgh, instead of emptying, I have the temperature raised during break times and, although this will kill off the common pathogens, it will do nothing to kill off sporing bacteria. Hosing the pigs prior to entry into the scalding tank helps appreciably. There is no doubt, however, that if some method could be devised of steaming the pigs in enclosed cabinets whilst still suspended from the rail, it would be a tremendous advantage. Tem-

perature control would be difficult because if it were slightly too hot it would result in reddening of the pigs' skin and, if very hot, it would result in semi-cooking of the skin with subsequent tearing in the dehairing machine.

Personally, I recommend that the slaughterman's clothing should consist of a boiler suit with short sleeves, rubber apron and rubber Wellington boots. The meat inspectors, in Edinburgh, wear white plastic aprons, which are excellent for their work, but it is doubtful if this material would stand up to the hard wear of the slaughtermen. It is essential that the clothing and apron be kept clean. The overalls should be changed twice per week and the rubber apron washed frequently during the day. I find that the front of the aprons are kept very clean but the sides are often caked with dried blood. Unfortunately the slaughterman's steel comes in contact with this dried material and results in contamination of knives during sharpening. It is thus obvious that flat tables should be provided in the slaughterhouse so that the aprons can be spread out and cleaned properly. Rubber boots should be cleaned frequently for similar reasons and also from the economical point of view as, if blood is allowed to dry on, the rubber soon perishes, resulting in early wastage of the boots. I find sheep slaughtermen the worst offenders in this connexion. The legs of sheep dressing stools should be scraped regularly to prevent build up of dried blood. Facilities for washing the slaughterman's equipment must be readily accessible and steam cases provided so that knives can be sterilised frequently and easily. The cleaning of equipment must be a recognised daily routine. The use of wood is necessary in the handles of knives and cleavers but the use of string or rope for binding handles should be prohibited. Gambrels and spreaders must be kept in a clean condition.

Slaughterhouses must have a sufficient number of wash-hand basins conveniently placed to the toilet so that washing of the hands may take place after using the sanitary convenience. It should be an offence for any person to urinate or spit in the slaughterhouse other than in the toilet. No person should be allowed to smoke in any part of the slaughterhouse which contains meat or blood and I, personally, view with disfavour the practice of slaughtermen dressing an animal and allowing cigarette ash to fall on the subcutaneous tissue. If adequate canteen facilities are provided it should be an offence for slaughtermen to eat their meals in the slaughterhall. In all slaughterhouses the occasional death of an animal occurs in the lairage and it is very convenient for the members of the meat trade to have those animals skinned in the slaughterhouse. A separate room should be kept for this purpose and it should be provided at the occupier's expense with dressing equipment, *e.g.* knife, scabbard, saw, etc. If those facilities are not available the dressing of such carcases should not be permitted.

Disembowelling

It was found by Australian workers that a quite common source of carcase surface contamination was from intestinal contents. As far as I am aware, in this country, there is very little tying off of intestine during the slaughtering process. In most abattoirs the sheep oesophagus is tied off and this prevents gross contamination of the throat region in these animals. The intestine, including the large intestine and rectum, should be removed as one piece and the duodenum incised only when the stomach has been partly pulled from the abdomen. The intact stomachs and intestine should be removed from the slaughterhall as soon as possible after inspection and no separation of mesentery should be permitted in the slaughterhall. The rectum should remain attached to the intestine. Hides should be removed frequently and hide barrows kept in clean condition. If they become filthy they are apt to contaminate the neck and foreleg of beef carcases when they are being squeezed past them in the slaughterhall passages. Ox and sheep feet should be collected in metal containers. Periodically throughout the day the slaughterhall floor should be cleaned with water and the booth in which cattle are dressed should be hosed with cold water after the completion of dressing of each carcase. All waste meat trimmings should either be processed or removed from the slaughterhouse before they begin to decompose. There is little risk of smell nuisance arising from an I.W.E.L. plant if the waste meat is fresh.

Manure should not be allowed to accumulate and, in the control of flies, I have found it a big advantage in summer to spray the walls of the manure pit with an insecticide spray, *e.g.* Lindane or DDT.

Wiping Cloths

There is no doubt that a very important source of contamination of the outside of carcases is from the wiping cloths used by slaughtermen when cleaning up the carcases. In certain foreign countries cloths have been prohibited and, in Edinburgh, no cloths are used in the piggery and only to a very limited extent in the line system for cattle. Power sprays are used and results seem to be very good. The meat trade, however, still object to the excess water used in this way, and for that reason, it is essential to ensure that slaughtermen's cloths should be sterilised daily.

Power sprays are used more in America than elsewhere and, after spraying, the beef carcases are shrouded with cloths soaked in saline. This latter practice results in a very pale anaemic appearance of the subcutaneous tissue and will never be accepted here. I always advise that calf carcases, which have been skinned in the abattoir, shall be wrapped in stockinette before removal. Good reports have been obtained at some abattoirs by the use of chemical bactericidal agents, *e.g.* hypochlorite or quaternary ammonium compounds, but rigid control is necessary to avoid waste and avoid the risk of taint arising.

Cooling

In my view chilling facilites should be available in every abattoir. In Scotland during the winter months this is probably not necessary but, in the

(*Concluded at foot of page overleaf*)

Some Reflections on Meat Inspection*

BY

N. NICOLSON

Veterinary Department, Corporation of Glasgow

IT seems strange that one can look in vain for a satisfactory definition of the term "meat" and although the Imported Meat Regulations do give an interpretation in relation to the commonly accepted food animals, one is made aware of the lack of a comprehensive definition when presented, for example, with a consignment of badger meat for human consumption. Some salient difficulties of the meat inspector stem from the reactions of various factions to a meat inspection service, *e.g.*, those who would ignore the importance of the service provided, those who would bend it to their own aggrandisement and those who would begrudge the application of that knowledge which special training and experience have evolved. With great respect may I suggest that the veterinary profession itself has fallen short by its lack of enthusiasm and support for providing and maintaining a veterinary-strong meat inspection service in this country. That we should demand a veterinary guaranteed meat and meat product from abroad and be content with a service of inferior quality in many areas at home, is illogical. This would support the opinion that the public is unable to assess the greatest values available to it. It is surely obvious that the veterinary sphere of influence should embrace the live animal in health and disease, and confer its guarantee of the fitness for food of each food animal after slaughter and the certification of each by-product. It is ludicrous that anyone other than a veterinarian should have the effrontery to grant a health certificate for such commodities as wool and straw packing. Unfortunately, the public, if it thinks at all of veterinary meat inspection,

* Paper presented to the meeting of the Association of Veterinary Food Hygienists at Stirling on January 11th, 1961.

Hygiene in Slaughterhouses—*Concluded.*

summer, a chill is essential. The quicker the subcutaneous tissue cools the better as, in my view, the tiny subcutaneous lymph vessels play some part in the spread of infection into the deeper tissues. When a carcase is set it is reasonably well protected by the hard fat on the outside and the pleura and peritoneum inside. The one big difficulty which I see in enforcing cooling below 45° F. is that a large proportion of the meat sold in this country is from dead meat markets and, if carcases are removed from a lower temperature than this, there is apt to be condensation of moisture on the carcase. This sweating lowers the appearance of the carcase and provides a suitable medium for the growth of bacteria of the *Achromobacter* group and *Proteus* group. The meat wholesalers prefer that no sweating shall occur and I have found that even the high-class butchers prefer to ripen their meat in winter outside the chill room.

Conclusion

With the large incidence of tuberculosis found in slaughtered cattle in this country in former years the Meat Inspection staff had to concentrate largely on this infection. Now the disease is practically non-existent, public health staffs have more time to survey the slaughterhouse scene and should endeavour to raise the standard of hygiene. The Australian workers found, in fact, that contamination could be reduced by 80 per cent. How much of the *Salmonella* infection found in meat products is derived from a diseased animal and how much from *post-mortem* infection is difficult to estimate but figures of 10 per cent. for the former and 90 per cent. for the latter source have been given. In addition, I have already mentioned the importance of *Cl. welchii* in food poisoning incidents. The source of this infection is usually from the intestinal contents of food animals and, although I have no doubt that the control of this type of poisoning is by adequate cooling of cooked meat, I feel something should be done to reduce the amount of infection. I also feel that some research work should be carried out to settle the controversy on whether power sprays are better than wiping cloths for reducing surface contamination, and whether this excess washing has any deleterious effect on the keeping quality of the carcase.

It is obvious that in Scotland Food Hygiene Regulations are required on similar lines to those in England. When these come into force every effort should be made to get the co-operation of the slaughtermen and only after failure in this direction should legal action be taken. Two years ago I gave a short course of lectures and demonstrations to young slaughtermen and, although they attended well, the benefit they derived was doubtful. They were, however, intensely interested in the demonstration of bacterial growth on culture plates and I feel that the effort in arranging such a course was well worth while.

References

GALTON, M. M., SMITH, W. V., MCELRATH, H. B., & HARDY, A. B. (1954a). *J. Infect. Dis.* **95**. 236.

MCDONAGH, V. P., & SMITH, H. G. (1958). *J. Hyg. Camb.* **56**. 271.

NEWELL, K. W., MCCLARIN, R., MURDOCK, C. R., MACDONALD, W. N., & HUTCHISON, H. L. (1959). *Ibid.* **57**. 92.

immediately places emphasis on "disease," and in relation to food, this is abhorrent. It would be a great step forward were veterinary supervision to emphasise rather the purity and wholesomeness of a product. One can visualise the dilemma of a veterinary lecturer addressing an audience of housewives on the recognition of meat for quality, condition and freedom from abnormality. To speak coldly of disease conditions in this connexion might drive his listeners to vegetarianism. It would seem, therefore, that some general education of the public is called for, so that veterinary supervision in meat inspection would be synonymous with purity, rather than an echo of noxious diseases. This is an era of mass cooking, with numerous canteens, school cooking centres, etc., and it is gratifying that in some districts the veterinarian meat inspector is consulted in the tracing of faults in technique, and in the analysis of complaints and in assuring that contractors' supplies are according to contract. Such problems must be handled with great impartiality and independent judgment.

The Duties of a Meat Inspector

The meat inspector is required to be knowledgeable about beef, mutton, pork and also in relation to horse flesh for human consumption, poultry, game and fish.

Horse flesh is examined mainly for certification for export to the continent of Europe. The *post-mortem* examination should, in my opinion, be analogous to that of sheep carcases. The detailed examination of lymph nodes need not be so specific as for cattle. Tuberculosis, with its distinctive manifestation in horses is of rare occurrence and in the past 15 years or so I have seen but 3 cases, and some years have passed since I saw the last of these. Thanks to the Attested Herds Scheme, artificially reared foals are unlikely to be fed indictable cows' milk now. Most condemnations of horse flesh are on account of dropsy, emaciation, injury, bruising and arthritis. It might be well to mention in relation to horse flesh, a constant feature of the flesh of blood horses and hunters. This is constantly of a very dark colour readily considered unmarketable according to our standards. Such flesh is in marked contrast to that of other horses. "Blood splashing" is another common feature of horse carcases and is found spread over the "leaf-seam" fat which fortunately is often removed from export carcases.

Poultry inspection and fish inspection, although omitted from our professional examinations, are of considerable importance. Examination of poultry could be simplified were all to pass through a central market or clearing house. A large proportion of birds are consigned to fish markets but many go direct to retailers and it is advisable that the latter should be aware of the advisability of presenting consignments for inspection. The alternative is to risk prosecution should unfit birds be found on routine visits. However, most reputable traders are anxious to notify the inspecting authority so that their merchandise may be above reproach.

Fish inspection requires a very independent judgment, a knowledge of the trade and of the state of the market. In general when supplies are plentiful and sales slow, wholesalers are anxious to classify stale fish as quite decomposed, but when supplies are short they may be adamant that similar fish is without blemish. It can be appreciated that the demarcation line between staleness and decomposition imposes a great responsibility on the fish inspector, and the greatest confidence can be derived from a real interest and experience in this sphere. Linked to the fish trade are consignments of rabbits, hares and the occasional carcase of venison, the latter often badly bled and dressed, and therefore liable to early decomposition. With game of various kinds there lives with us the eternal problem of the sure classification of ripeness, so much relished by many, compared with decomposition and unfitness. I would not pretend to offer any rule or gauge for others to use in this connexion.

Inspection in the Abattoir

To return to the main stream of meat inspection in the abattoir, a systematic plan of lay-out and working is essential to the production of a product in which one can have full confidence. From the moment livestock are admitted into the precincts they should be the responsibility and under the full control of the local authority in regard to lairaging, feeding and watering and finally slaughtering and preparing for food. As a relic of many decades past, there prevails a system of slaughtering by contractors licensed by the local authority. These men are self-employed, conservative in their methods and outlook, resent direction and usually make worthwhile advances in technique difficult to achieve. The maintenance of a high standard of hygiene and the replacement of worn equipment have less appeal than greater output and therefore greater earnings. It is therefore desirable that slaughterers and all those engaged to this end should be employees of the local authority. In the recent outbreaks of foot-and-mouth disease in a large city abattoir, had the slaughterers been so employed, the difficulties attending the expeditous elimination of diseased animals would undoubtedly have been greatly reduced. Furthermore, the introduction of the line system of slaughtering would almost necessitate that slaughtermen should be local authority employees and not privately employed. Under such a more streamlined system routine inspection can be facilitated and more efficient. The line system of slaughtering pigs has proved highly satisfactory in the better equipped bacon factories for many years and should also be a constant feature of all pig slaughter halls.

A good meat inspection service and the implementation of the Scottish Meat Regulations demand the assistance of trained inspectors, eligible to be so employed by a local authority after certification by the Royal Sanitary Association of Scotland which is the examining body. The course of training extends over a minimum of 2 years and includes the insistence on prescribed practical training in an abattoir. Of the successful candidates, 2 groups can be made, *viz.* those who have had previous training as butchers

or fleshers and those who have not. The special knowledge and experience of the trade give the first group a great advantage and value over the others.

A rota system of duties in the various sections of a meat inspection department helps to prevent any staleness that might accrue from the monotony of the repetitive operations which are inseparable from routine examinations. It is also advantageous to alternate abattoir duty with inspections outside it as, for example, inspections of retail establishments, meat factories, canteens, etc., when such a scheme is practicable. It is well that the product of the abattoir should remain under the surveillance of the meat inspector. At this stage disputes between retailer and customer can usually be resolved by the independent impartial meat inspector.

Let me return to the abattoir, the end-point of the efforts of the agriculturist, the livestock breeder, the biochemist and the veterinarian, where can be seen the successes and the failures. However, the impression is gained that not many pursue the results to this stage and it would seem that fewer veterinary practitioners corroborate diagnoses in the abattoir than was the custom in former generations.

Problems in Meat Inspection

The meat inspector also has his own disturbing problems such as those border-line emaciation cases, those carcases which he is obliged to decide are dropsical or not, those which raise the common puzzle of pigmentation. There is no standardisation for these any more than there is for deciding what number of *Cysticercus bovis* cysts constitute generalisation. But one is confident that the veterinary meat inspector's appraisal of such cases is not wide of the mark.

One would expect that the Imported Food Regulations could have little variance of interpretation from one end of the country to the other. However, when a M.O.H. of a Port Authority can accept unidentifiable chopped meat in cartons, as different from Prohibited Meat as described in the Order and suggests that it should be regarded as sausage meat, one realises that one has run into another problem in meat inspection. Bear in mind that once accepted by a Port Local Authority, imported meat thereafter cannot be refused entry to another local authority. The importation of meat from Australia, New Zealand and Argentina demands the attendance at the port of an inspector at irregular hours outwith the ordinary duty times. Manifests of cargoes are submitted by the shipping companies, and the officers of Customs and Excise also give notice of freight which may require the meat inspector's attention.

The maintenance of hygienic conditions at landing places must be stressed here. Dock sheds and quays are dusty places, the common repository for such a variety of commodities noxious and otherwise, so that prevention of contamination of imported meat must be ensured. The breakdown of refrigeration systems on board ship can give rise to conditions requiring the special examination of cargoes of meat, and the staining and contamination of carcases with various substances can occur. This may require the enlistment of a chemical analyst to determine the precise contaminant and on other occasions the bacteriologist alone can guarantee the safety or otherwise of doubtful material. In regard to ships' stores, it might be well to observe that the victualling of British ships is under the supervision of special inspectors of the Ministry of Transport and these gentlemen appear to have a unique scheme for classifying stores as to their fitness for human consumption for the ship's company. One category is described as sub-standard and as such may not be used for food. These sub-standard stores on being landed are not cargo, are not "imported food" as they are not accompanied by an official certificate, and therefore, under the terms of the Imported Food Regulations, constitute prohibited meat and must be destroyed or re-exported and may not be sold for food locally. Meat which is imported from Ireland is not included in the term "imported meat" and may be exposed in quay sheds to the risk of contamination there for variable periods of time. Ordinary hygenic regulations do not apply to landing places.

Veterinary Co-operation

In Glasgow, the Veterinary Department is happy in its association with the University Veterinary School and fortunate to be able to provide those materials and facilities which are an obvious helpful adjunct to veterinary teaching. The Veterinary School reciprocates with a ready examination of pathological specimens from time to time. Such an amicable arrangement is highly satisfactory and assures a specialised report to support the practical judgment and clarify obscure cases.

From its records the abattoir provides the last irrefutable list of disease incidence in livestock and at present it is in the abattoir that the dregs of the bovine tuberculosis problem can be seen. The Veterinary State Service is alive to the usefulness of abattoir records for graphing disease in food animals and the economic loss is reflected here, while the urgency for dealing positively with each is indicated. A veterinary supervised meat inspection service is obviously more sympathetically interested in the problems and efforts of the Veterinary State Service to reduce and control animal disease.

CONGRESS NOTES

Excursion

The excursions to Messrs. Huntley and Palmers, September 4th, and to Blenheim Palace, September 5th are fully booked and it is regretted that no further bookings can be accepted.

Golf Tournament

Visitors to Oxford during Congress week are reminded of the golf tournaments which will be played this year at Frilford Heath Golf Club (7 miles from Oxford on the Wantage road) at 2.30 p.m. on September 7th. The tournaments will be for the Simpson Trophy for men and the Dunkin Trophy for women. The green fee will be 10s. per head and tea will cost 2s. 6d. Applications for entry, stating handicap, should be sent direct to the organiser, Mr. I. Meikle, 14, Queen's Road, Reading, Berks., with a remittance for 12s. 6d.

Divisional News

THE DUMFRIES AND GALLOWAY DIVISION

The annual general meeting was held in the Stuart Hotel, East Kilbride, on May 10th, at 12 noon. The President, Mr. R. L. Bell, was in the chair. Eleven members and 1 visitor were present.

Minutes

The minutes of the meeting held on February 1st, 1961, were read and signed.

Arising from these minutes the secretary reported that he had been in communication with the Lakeland Division on the subject of the proposed Meat Inspection Refresher Course. The Lakeland Division agreed that a joint approach be made to Mr. Thornton, of Newcastle upon Tyne, in this matter.

Correspondence

Letters were read from the B.V.A. on the following subjects:—

(a) THE VETERINARY RECORD. The purpose of this letter was to draw attention to the creation, in THE VETERINARY RECORD, of a new feature of Division and Club news, and to invite regular information about the Division's activities, and, in particular, summaries of clinical papers together with the discussions that follow. After a discussion, it was agreed that the secretary, as an experiment, should arrange to have the next meeting recorded on tape, from which a typescript might be made for transmission to THE VETERINARY RECORD. (b) the services of sales representatives. (c) swine fever. (d) the Harry Steele-Bodger Memorial Fund. (e) the B.V.A./R.S.P.C.A. agreement. A letter was read from Mr. A. J. Kennedy which stated that there were instances of complete investigation of outbreaks of disease and services to stock-owners, by the V.I.O. Services, without any practising veterinary surgeon being informed. His opinion was that the instructions to veterinary investigation officers, issued in 1935, were not being observed. Mr. Kennedy requested that this matter be discussed by the Division.

Secretary's Report

The secretary's report was read and approved.

Treasurer's Report

The treasurer's report was read and approved. In the discussion on this report, attention was drawn to the discrepancy between the number of members, as shown by the Membership Book, and the number who actually paid subscriptions. It was agreed that the secretary should inform members of this position.

Election of Officers and Council, 1961/62

The following office bearers were elected for the year 1961/62:—

President: Mr. James Millar; Vice-President and President Elect: Mr. Frank Dunlop; Secretary and Treasurer: Mr. Alex Hector.

Executive Committee: The Excutive Committee would consist of the office bearers, together with Mr. C. McNulty, Mr. A. Reid, and Mr. T. Wolfe.

Representatives to Council: The President and honorary secretary.

Auditors: Mr. A. Reid and Mr. J. Barr.

Induction of New President

The President, Mr. R. L. Bell, introduced the new President, Mr. James Millar, and vacated the chair in his favour.

Next Meeting

Following a discussion, instructions were given to the secretary regarding the arrangements for the next meeting.

There being no other business, the meeting then adjourned.

★

Members were then met by Mr. J. M. Goldie, Area Agricultural Adviser, B.O.C.M., and his colleagues, and were entertained to lunch as guests of B.O.C.M. Thereafter, the meeting re-convened at the B.O.C.M. Demonstration Farm at South Cathkin where members saw demonstrations on the following subjects:—

(a) The 7th Ayrshire Bull Progeny Test.
(b) Beef from the Dairy Herd.
(c) Hormone Fattening.
(d) Early Weaning of Calves.
(e) Intensive Multiple Rearing of Bought-In Calves.
(f) Wintering of Ewe Hoggs on Slats.

Many questions arose from these demonstrations, and were ably answered by Mr. J. M. Goldie and Mr. A. S. Morton, the Farm Manager, at South Cathkin.

The President proposed a vote of thanks to Mr. Goldie and B.O.C.M.

THE NUTRITION SOCIETY

The Nutrition Society (Scottish Group) will hold a symposium in the Large Lecture Hall, College of Agriculture, Edinburgh, on September 30th, at 1.30 p.m. The subject will be "Nutrition and Poultry." The chairman will be Professor S. J. Watson, C.B.E. (Professor of Agriculture, University of Edinburgh), and the following contributions have been arranged:—

Dr. W. P. Blount: "The bird as an experimental animal"; Dr. M. E. Coates: "Advances in nutritional knowledge through studies with birds"; Professor S. Lepkovsky: "The hypothalmus and appetite"; Dr. J. H. Taylor: "Antibiotics and other growth-promoting substances"; and Professor M. F. M. Meiklejohn: "Birds as food for the human."

Further particulars may be obtained from the hon. secretary of the Scottish Group of the Nutrition Society, Dr. D. G. Armstrong, The Hannah Dairy Research Institute, Ayr, Scotland.

News and Comment

ATTESTATION IN THE IRISH REPUBLIC

On August 1st the Minister for Agriculture in the Irish Republic included the counties of Cavan, Monaghan and Longford in the Republic's Attested Area. Of the country's 26 counties 10—containing some 1,600,000 cattle in over 120,000 herds—are now attested. In addition the small part of Co. Westmeath west of the River Inny is also included in the Attested Area, the river making a natural boundary.

The first counties in the Republic to be declared attested—on December 5th, 1960—were Donegal, Mayo and Sligo. Counties Clare, Leitrim, Roscommon and Galway followed in early 1961. The arrangements under which counties are brought up to attested standard were agreed with the United Kingdom Agricultural Departments.

The Minister for Agriculture in the Republic also declared the counties of Carlow, Laois, Wexford and Wicklow to be Clearance Areas. The counties of Louth, Meath, Kildare, Offaly and Westmeath were declared as such on March 1st, 1961. These 9 counties contain over 45,000 herds and about 1,143,000 cattle. In a recent speech the Minister said that he hoped that they would become attested by the end of 1962.

UFAW SUMMER CONGRESS

The Universities Federation for Animal Welfare will hold its annual Summer Congress at Shipham, Winscombe, Somerset (in the Mendips between Bristol and Cheddar) from September 16th to 23rd, 1961.

The Annual General Meeting of the Veterinary Section of UFAW will be held on Sunday, September 17th, 1961, at 2 p.m., at Penscot Conference Centre, Shipham, Winscombe, Somerset (about 14 miles south-west of Bristol), and will be addressed by Sir Thomas Dalling, F.R.C.V.S., who will speak on: "Veterinary Activities in the Developing Countries."

All members of the veterinary profession and veterinary students are cordially invited to attend this meeting.

Enquiries are also invited regarding attendance at the Summer Congress for which the inclusive fee is £7 (reduced fee for students £3 10s.).

Further information is obtainable from UFAW (Summer Congress), 7a, Lamb's Conduit Passage, London, W.C.1. (Tel. No.: CHAncery 9221.)

SYMPOSIUM ON POULTRY DISEASES IN AFRICA

During the period July 17th to 19th, 1961, the Inter-african Bureau for Animal Health staged a Symposium on Poultry Diseases with special reference to Africa, as recommended by the Inter-african Advisory Committee for Animal Health in 1959.

The meeting was held at the Victoria Falls in the Federation of Rhodesia and Nyasaland, as a prelude to the annual series of meetings of the Advisory Committee and the Council of Management of the Bureau.

The delegates came from the Federation of Rhodesia and Nyasaland, the Federation of Nigeria, the Republic of South Africa, Mozambique, Sierra Leone, Upper Volta, United Kingdom, Bechuanaland, Kenya, Uganda, and elected Mr. G. J. Christie of Southern Rhodesia as chairman. Observers were present from FAO, Cyanamid International, and Pfizer International.

The agenda included discussions on the place of poultry and their products as a source of human food in Africa and the factors which limit production, and then passed to the various systems of housing in use. Diseases of importance to Africa in the viral, bacterial and protozoal groups were covered with special emphasis on Newcastle disease, the meeting passing a recommendation that in Africa prophylactic measures should include vaccination, preferably using a live attenuated vaccine. The epizootiology of the disease in Africa was also covered.

The meeting in addition recommended that Governments should accept that disease-free poultry production is an activity of first importance in Africa and should be supported by a network of facilities for early detection of disease by veterinarians. The delegates accepted a standard *pro forma* as a health certificate for export and import of poultry and recommended that courses on poultry management should continue to be arranged by C.C.T.A. in both East and West Africa.

THE REGISTER OF VETERINARY SURGEONS

The undermentioned gentleman was admitted to Membership of the Royal College of Veterinary Surgeons on July 31st, 1961, in virtue of the registrable degree of B.V.M.S. conferred on him by the University of Edinburgh:—

BULLEY, Frank Robert Terry, Dozmay, Old Polzeak, Cornwall.

Mr. Lewis Daniel Davies, Caerwilym, Felinfach, Lampeter, Cardiganshire, was admitted to membership of the Royal College on August 1st, 1961, in virtue of the registrable degree of B.V.M.S. conferred on him by the University of Edinburgh.

At their own request the names of the following have been removed from the Register, as from July 17th, 1961:—

Beauregard, Sally Toutant (Miss) (now Mrs. Le Camp); Brooks, William Turley (F.R.C.V.S.); Clark, W. King; and Favell, John William (Supplementary Veterinary Register).

UNIVERSITY NEWS

Dublin

At Commencements held on June 29th the following candidates were admitted to the degree of Bachelor in Veterinary Medicine:—

Second Class Honours: Desmond J. Thompson, B.A.

Pass: Vincent Murray, B.A.

Following Commencements the new graduates were admitted to membership of the Royal College of Veterinary Surgeons by Mr. P. Harnett, Director of Veterinary Services, Republic of Ireland. Mr.

J. A. Flynn attended on behalf of the Veterinary Council of Ireland.

Liverpool

Examination List, August, 1961

Faculty of Veterinary Science, Degree of B.V.Sc. Second Examination, Part III, Animal Management

Byrne, D. J.; Charnock, M.; Chew, P.; Clement, J. E.; Cross, Janet A. H.; Dolan, M. S.; Duckworth, R. H.; Edginton, A. B.; Evans, G. R. E.; Evans, M. H. D.; Fasawe, T. C. K.; Fox, R. I.; Frith, Margaret; Gough, P. J.; Hennessey, Marie C.; Holness, Sheila L. A.; Jones, D. E.; Lawson, J. B.; Lee, R.; Mann, J. A.; Metcalfe, D. T.; Parsons, G. A. T.; Price, D. L.; Stocks, A. G. H.; Thomas, D. J. S.; Topping, A. R.; Wade, A. J.

PERSONAL

Miss J. O. Joshua is to appear in a television interview on the B.B.C. to-morrow (Sunday, August 13th) at 6 p.m. The subject will be the responsibility which people owe to animals.

Dr. C. Horton-Smith has been awarded the Huxley Memorial Medal for 1961. The Huxley Memorial Medal and Prize is awarded by the Governing Body of the Imperial College of Science and Technology to a student or former student of the College selected by the Trustees for his research in some branch of Natural Science in which the late Professor Huxley was distinguished. The memorial was founded in 1900 in his memory.

Dr. Horton-Smith has, for a number of years, been a senior principal scientific officer at the Houghton Poultry Research Station which was created by the Animal Health Trust and is now jointly administered by the Trust and the Agricultural Research Council.

Births

GRIFFITHS.—On August 2nd, 1961, at 94, Alcester Road, Moseley, to Sallie (*née* Bishop) and Paul Griffiths, B.SC., M.R.C.V.S., a son, Simon William Paul.

NEWSAM.—On July 26th, 1961, to Doreen, wife of Ian D. Newsam, at St. Andrew's, Melbourne, Australia, a daughter, Judith, sister for Jill.

STOCKMAN.—On August 1st, 1961, to Valerie and Michael Stockman, MS.R.C.V.S., of 114, Hillside Gardens, Barnet, Herts., a son, Duncan, brother for Andrew and Caroline.

R.C.V.S. OBITUARY

We record with regret the deaths of the following members of the profession:—

CAMPBELL, William Wallace, 13, St. Peter's Place, Canterbury, Kent. Graduated from the Glasgow Veterinary College, December 19th, 1904. Died July 28th, 1961, aged 79 years.

HANS, Arthur Joseph, of Glenfield Farm, Branscombe, Seaton, Devon. Graduated Dublin, December 7th, 1935; died July 26th, 1961. The funeral was held at St. Boniface Church, Shirley, Southampton.

STROUD, E. Lionel, 39, Egerton Gardens, West Ealing, London, W.13. Graduated December 19th, 1895, from the Royal Veterinary College, London. Fellow of the Royal College of Veterinary Surgeons, May 10th, 1902. Died August 1st, 1961.

COMING EVENTS

September

2nd (Sat.). STREATLEY '58 CLUB REUNION. Annual Dinner at "Ye Miller of Mansfield."

3rd to 9th (Sun. to Sat.). 79th Annual Congress and Exhibitions of the British Veterinary Association at Oxford.

7th (Thurs.). ROYAL VETERINARY COLLEGE ASSOCIATION. Annual Dinner during the B.V.A. Congress at St. Edmund's Hall, Oxford.

GLASGOW VETERINARY SCHOOL ALUMNUS ASSOCIATION. Dinner at the Mitre Hotel, Oxford, 7 p.m.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the date on which disease has been confirmed, followed by the postal address and local authority.

Anthrax

August 1st, 1961. W. Gibson, Westerton of Stracathro, Brechin, Angus (Parish: Stracathro). (Cattle.) ANGUS.

August 3rd, 1961. W. Parris, Aller Farm, Up Ottery, Honiton, Devon (Parish: Up Ottery.) (Cattle.) DEVONSHIRE.

Fowl Pest

August 1st, 1961. G. Bryenton, The White Lion, Heveringham, Halesworth, Suffolk. EAST SUFFOLK.

August 1st, 1961. R. Bowling & Sons, White Mill Poultry Farm, Whittle le Woods, Chorley, Lancs. LANCASHIRE.

August 1st, 1961. B. Lundy, Moor Farm, Caistor, Lincs. LINCOLN, PARTS OF LINDSEY.

August 2nd, 1961. J. W. Cranwell, The Grove, Little Thetford, Ely, Cambs. Disease at: The Garden, Watsons Lane, Little Thetford, Ely, Cambs. ISLE OF ELY.

August 3rd, 1961. P. W. Money, 1, The Witches, Little Thetford, Ely, Cambs. Disease at: The Orchard, Little Thetford, Ely, Cambs. ISLE OF ELY.

August 4th, 1961. E. Blacker, Sandbraes Farm, Caistor, Lincoln. LINCOLN, PARTS OF LINDSEY.

August 4th, 1961. S. Winstanley, Hartwood Hill Farm, Preston Road, Chorley, Lancs. LANCASHIRE.

August 4th, 1961. R. Bowling & Sons, Whitehill Poultry Farm, Whittle le Woods, Chorley, Lancs. Disease at: Adlington Hall Farm, Adlington, Chorley, Lancs. LANCASHIRE.

August 5th, 1961. J. Fitzall, Moorfield Farm, Moss Lane, Hoole, Preston, Lancs. LANCASHIRE.

August 6th, 1961. H. K. Denny, Waverley, Sandy Lane, Barham, Ipswich, Suffolk. EAST SUFFOLK.

August 6th, 1961. A. Duke, Wenden Hall, Wenden Ambo, Saffron Walden, Essex. ESSEX.

August 6th, 1961. F. Threadgold, Oxenham Farm, Great Wakering, Southend-on-Sea, Essex. ESSEX.

August 6th, 1961. M. I. F. Burrough, Newholme, Chapel Lane, Great Wakering, Southend-on-Sea. Disease at: Burwoods Farm, Foulness Island, Essex. ESSEX.

August 6th, 1961. Mrs. F. M. Jones, Baylham House Farm, Baylham, Ipswich, Suffolk. EAST SUFFOLK.

August 7th, 1961. F. Evans, Hillside Farm, Claydon, Ipswich, Suffolk. EAST SUFFOLK.

August 7th, 1961. R. J. Baker, Little Dykebeck Farm, Wymondham, Norfolk. NORFOLK.

Swine Fever

August 2nd, 1961. W. A. Trick, Mile End Row, Melyn, Neath, Glam. Disease at: Pig Cotes, Pontallady, Penrhiwtyn, Neath, Glam. BOROUGH OF NEATH.

August 2nd, 1961. G. Bailey, Lawton Heath Holding, Betchton, Alsager, Stoke-on-Trent, Staffs. CHESHIRE.

August 2nd, 1961. R. Crow, Higher Foxley Farm, Alsager Road, Audley, Stoke-on-Trent, Staffs. STAFFORDSHIRE.

August 2nd, 1961. F. C. Highnam, Bucklestone House, Tweentown, Cheddar, Somerset. Disease at: The Piggeries, Lake House Lane, East Brent, Highbridge, Somerset. SOMERSET.

August 2nd, 1961. F. Stone, Moor Edge Farm, Owler Bar, Sheffield, Yorks. DERBYSHIRE.
August 2nd, 1961. Messrs. Parkinson & Poulson, New House Grange, Sheepy, Atherstone, Warwicks. LEICESTERSHIRE.
August 3rd, 1961. J. Quinn, 12, Peascot Street, Windsor, Berks. Disease at: Cippenham Lodge Farm, Cippenham, Slough, Bucks. BUCKINGHAMSHIRE.
August 3rd, 1961. H. Tomley, Oakdene, Petton, Ellesmere, Salop. SHROPSHIRE.
August 3rd, 1961. S. Prescott, 5, Millbank Smallholdings, Maghull, Liverpool, Lancs. LANCASHIRE.
August 3rd, 1961. H. G. Hodgkins, Mill Farm, Coton Clanford, Haughton, Stafford. Disease at: The Newlands, Coton Clanford, Haughton, Stafford. STAFFORDSHIRE.
August 4th, 1961. E. Lewis, Smithfield House, Smithfield Road, Pontardawe, Swansea, Glam. Disease at: Piggeries, Vicarage Field, Heathfield Road, Pontardawe, Swansea, Glam. GLAMORGAN.
August 4th, 1961. H. Redfern, Mount Cottage, Boylestone, Derby. DERBYSHIRE.
August 4th, 1961. J. L. Clark, Rose Garth, North Frodingham, Driffield, Yorks. YORK, EAST RIDING.
August 4th, 1961. J. H. Bush, Penny Close, East Orchard, Shaftesbury, Dorset. Disease at: The Piggeries, Trapdoor Farm, East Orchard, Shaftesbury, Dorset. DORSET.

Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Profession and Commerce

Sir,—Two advertisements appeared within a week recently, from the same firm of manufacturers of animal foodstuffs.

One, in a national Sunday paper, asked for an administration officer in the firm's department of market research. "The starting salary will not be less than £1,700 per annum. . . ."

The other, in your columns, was for a veterinary surgeon. "Starting salary will be £1,000 to £1,200 according to experience. . . ."

Comment is needless.

Yours faithfully,
BRENDAN HALPIN.

86, Elmfield Crescent,
Exmouth,
Devon.
August 6th, 1961.

Hypovitaminosis A in Cattle

Sir,—It was most interesting to read the recent account of apparent hypovitaminosis A in young cattle in East Anglia (Abrams *et al.*, 1961) in THE VETERINARY RECORD. While the authors are to be congratulated on their work one cannot agree with their implication that this is a new condition associated with modern intensive systems of husbandry.

During the period 1954-5 the writer was engaged in clinical work in the Watten-Swaffham area of Norfolk. The type of case described in the article was quite common at that time, and to colleagues and farmers it was a well recognised condition. It was known that such cases responded to the administration of vitamin A, and they were accepted as being due to a lack of that vitamin. In addition many farmers, particularly those who bought in calves for rearing, were convinced that an injection of a vitamin A preparation was of value in the prevention of calf scours. All this suggests that the cattle of Norfolk have suffered from a lack of this vitamin for some time.

The cult of the sugarbeet may have something to do with the situation. Many farms in Norfolk concentrate on sugarbeet to an alarming degree, at least in the eyes of those used to the Midlands and Southern England. The sugarbeet can be blamed for many things. In cattle the beet tops cause poisoning, while the beet pulp produces digestive and metabolic disturbances. As if this was not enough the carriage of sugarbeet distributes mud on the roads making the passage of the veterinary surgeon in his motor car hazardous in the extreme.

Cultivation of sugarbeet reduces the area of grass available for cattle, and thus may be associated with malnutrition in young animals. If more cane sugar was imported the reduction in the acreage of sugarbeet in Norfolk might benefit the health of the cattle.

Yours faithfully,
JOHN STRATTON.

Royal Veterinary College,
Department of Medicine,
Royal College Street,
London, N.W.1.
July 27th, 1961.

References

ABRAMS, J. T., BRIDGE, P. S., PALMER, A. C., SPRATLING, F. R., & SHARMAN, I. M. (1961). *Vet. Rec.* **73.** 683.

Prolapse of Intestine *per vaginam* in the Ewe

Sir,—It is evident from the correspondence earlier this year that this condition is more common than had been appreciated, cases having been seen throughout the country.

It occurred to me that it would be advantageous to arrange a meeting at Oxford during the Congress when interested members could have an informal discussion on the subject.

I have been in contact with the Congress secretary who has very kindly undertaken to try to find a suitable room in the late afternoon or early evening of one day for this purpose.

Final arrangements have not yet been completed but the time and place of the meeting will be displayed on the Congress notice board. I hope as many as possible will attend as I feel the significance of this condition may be of greater importance than is at first apparent.

Yours faithfully,
J. B. WHITE.

63, Bouverie Avenue,
Salisbury,
Wilts.
August 8th, 1961.

Interdigital Cysts in Dogs

Sir,—May I appeal to your readers in general practice for material from dogs suffering from interdigital cysts? This condition is all too familiar to small-animal practitioners and yet little is known of the nature and pathogenesis of the condition.

Preliminary studies suggest that this condition resembles "Barber's" interdigital pilonidal sinus (Joseph & Gifford, 1954). This condition is an occupational hazard of hairdressers and arises as a result of the penetration of short bristly hairs through the interdigital space, giving rise to pseudo-follicles lined by much keratin. This keratin narrows or closes the upper portion of the tract, giving rise to a cyst within the dermis which is associated with a variable degree of chronic inflammatory reaction. Secondary infection is not uncommon. Unlike the dog, man has no hair follicles within the interdigital space.

If any general practitioners favour the surgical removal of interdigital cysts, it would be greatly appreciated if they could submit this material to this Department. The cysts should not be opened nor ruptured as such are of no value for this investigation.

Yours faithfully,
J. C. WHITNEY.

Department of Veterinary Pathology,
Royal (Dick) School of Veterinary Studies,
Edinburgh, 9.
July 29th, 1961.

Reference

JOSEPH & GIFFORD (1954). *J. Dermatology and Syphilology*. **70**. 616.

Listeriosis in Rabbits

Sir,—The following case is of interest in view of the present expansion of the rabbit industry.

A New Zealand White doe, heavily pregnant, became ill. She was treated with intramuscular injections of oxytetracycline,* but died 2 days after aborting her litter. At *post-mortem* examination the internal organs appeared normal, except that the uterus was enlarged and showed a severe endometritis with necrotic contents. Bacteriological examination gave a pure growth of *Listeria monocytogenes* on blood agar from the uterine mucosa. Other aerobic cultures from liver, heart blood, duodenum and jejunum failed to yield either *Listeria* or any other significant organism.

As far as I am aware, on previous occasions when *Listeria* has been isolated from the rabbit uterus or placenta it has also been isolated from other sites including liver, but not necessarily from heart blood (Paterson, 1940). The present experience would suggest that culturing from the uterus of an aborting doe would be a useful routine procedure. In cattle and sheep with *Listeria* infection of the uterus death of the foetus and consequent abortion usually occurs during the later stages of pregnancy. However, no premonitory symptoms have been observed and the dam usually makes an uneventful and spontaneous recovery (Paterson, 1959).

* Terramycin.

Infection with *Listeria monocytogenes* has not been commonly encountered in rabbits in the past, but the present expansion of the rabbit industry leading to the concentration of large numbers of rabbits on certain premises carries the risk that this, and other infections, may become more common. The organism can cause a severe and often fatal illness in man, characterised by hepatic necrosis in infants and meningitis in adults (Paterson, 1959). Therefore any occurrence of the disease in domestic animals is of public health significance, especially when, as in the case described above, the organism is shed in the discharges of the sick animal.

Yours faithfully,
R. G. HOLMES.

Ministry of Agriculture, Fisheries and Food,
Veterinary Investigation Centre,
Mile Cross Lane,
Norwich.
August 3rd, 1961.

References

PATERSON, J. S. (1940). *J. Path. Bact.* **51**. 441.
——— (1959). In Stableforth, A. W., and Galloway, I. A. "Infectious Diseases of Animals: Diseases due to Bacteria." Vol. I. P. 379. Butterworths, London.

Veterinary Services in Africa

Sir,—The item headed "Africa's Need of Veterinary Surgeons" in THE VETERINARY RECORD (**73**. 510) in which remarks made by Sir Thomas Dalling are quoted would appear to emanate from an "off-the-cuff" discourse with the press, but the general impression given is that little has been achieved in the field of veterinary education by the Colonial Veterinary Services of the metropolitan powers and all still remains to be done by United Nations Organisation agencies.

The round figures given indicate the very general terms in which the matter has been treated, but since the statement has been published, I crave your permission to publish my comments on these remarks.

This Bureau of the Commission for Technical Co-operation in Africa south of the Sahara in 1955 published (*Bull. epiz. Dis. Afr.*, Vol. 3, p. 139) a comparative table of data in all countries in Africa south of the Sahara on animal populations, land areas, veterinarians in public services and private employment, etc., in which accurate figures based on a questionnaire to these countries were used.

The situation has not unduly changed since, if one bears in mind the meaning of the word "expatriate," since the vacuum created by the retirement of some European career personnel is being filled by contract veterinarians of other European, Asian and American nationalities, and I venture to suggest that the total number of veterinarians in Africa is considerably higher than during the end periods of colonialism in many territories overseas of only a few years ago. Further, and in addition, there are many more European veterinarians in Africa to-day who are not "expatriates" since they were born and bred in the country in Africa in which they serve, or work in provinces of their own country in Africa.

As there are 420 veterinarians in the Republic of South Africa and South West Africa, there must be nearly 1,100 veterinarians in Egypt (presuming that Egypt is considered as part of Africa) according to Sir Thomas's statement that in these 2 countries there is a total of 1,500.

Again the proportion of "expatriates" can hardly be regarded as 90 per cent. of the total in any "African" country as is stated, when compared with the fact that in Uganda, for example, in 1960, there were 20 persons of Uganda nationality licensed to practice veterinary surgery and in the service of the government, compared with 19 who were non-nationals. The proportion in favour of nationals in Uganda is much higher to-day, and this tendency is increasing steadily in many countries in Africa.

Regarding the instruction of Africans in veterinary science, there is no problem. A plethora of scholarships is available from a variety of official and private sources for students to study in overseas universities and colleges, and a number estimated to exceed 200 Africans are at present studying veterinary science in the United Kingdom, several countries in Europe, America, Canada, India and Australia, providing nearly 40 new graduates per annum. A problem to those of us trained in the U.K. might seem to be in the standard of this instruction in some cases and the qualification gained, but this will no longer be a problem when newly independent countries fit the legal standard for veterinary practice to that of graduates from all sources who are their own nationals.

There are at times difficulties in placing the candidates in countries which offer training facilities but this difficulty lies largely in the lack of adequate educational standards of the applicants for university matriculation. Most universities in the countries mentioned above almost "fall over backwards" in order to overcome these deficiencies and thereby fill the places they have set aside for candidates from developing countries.

To provide teaching facilities in veterinary science in Africa south of the Sahara, while desirable, is not necessarily wanted by Africans. Africans infinitely prefer an overseas degree to a local degree, where a choice is available, hence the difficulty in establishing a degree course in veterinary science at Ibadan University in Nigeria—now under discussion for 10 years and more, and the low output of Makerere College diplomates which have numbered an average of 4 per annum in the last 3 years, and not a dozen as stated.

I see no necessity for any outside organisation to plan a series of training courses for lay assistants. I do not know of any country in this continent where such a school is not already in existence, or where access to such a school in the immediate neighbourhood is not available. The instruction in these schools improves annually and the level of ability of the students rises steadily. An increasing cadre of such livestock assistants under veterinary supervision at the base of the veterinary pyramid, can be of much value to a territorial veterinary service in the care of the health of its livestock, while still not trespassing the boundaries of the practice of veterinary science. This cadre must always exist, since no country could afford the full complement of veterinarians necessary to carry out all the veterinary services which governments should supply.

Once again, I repeat that my object in commenting on the statements as recorded is to defend the overseas veterinary services of those counties in Europe who had and still have dependencies in Africa, in their activities leading to instruction of Africans as veterinarians and sub-professional staff.

Excellent work has been carried out, and while much remains to be done, it is merely a question of intensification and not initiation as is suggested.

Yours faithfully,
W. G. BEATON.

C.C.T.A.
InterAfrican Bureau for Animal Health,
Muguga,
P.O. Kikuyu,
Kenya.
July 31st, 1961.

Displacement of the Bovine Abomasum

Sir,—I would like to congratulate Messrs. Pinsent, Neal and Ritchie on their account of displacement of the abomasum and to remark that it is comforting for me to learn that others also encounter the atypical case. For one who feels that he is becoming less capable, at times, of detecting and understanding abomasal displacement, it is interesting to read that the writers have mentioned the atypical case as being occasional, and I would be further interested to know the exact percentage of such cases in the 80 under review.

Frequently I find myself confused by cases where displaced abomasum is suspected but clinical findings are not in keeping with the more accepted typical picture as described by the Liverpool writers. In this respect I would like to put some of my thoughts on paper in the hope that we may hear of the experiences of others.

As far as incidence is concerned, I note that the authors have not overstressed the possible rôle of parturition as an aetiological factor. My own experience has been mostly of late *post-partum* displacements, where history and owner observation appear to preclude an earlier undetected illness. Could it be that in part we have confused an apparent early *post-partum* incidence with one which is associated rather with the conditions prevailing under general winter husbandry, where in many dairying areas the bulk of annual calvings are often occurring shortly before or soon after the beginning of housing.

The clinical findings and degree of severity of the clinical illness can be most varied, and I like to sort out my own mind by thinking of the displaced abomasum as being obviously tympanitic or mildly and often apparently non-tympanitic. The more severe the tympany the more severe the illness, while the degree of both may remain fairly constant or may vary throughout the illness.

In the non-tympanitic or mildly tympanitic case, auscultation may prove repeatedly negative in so far

as "abomasal" sounds are not heard; and where rumenal sounds are diminished or absent over the posterior rib area but clearly audible in the sub-lumbar fossa, ballottement as referred to is a "must," even without the aid of concurrent auscultation.

In some of these mildly or non-tympanitic cases it has been my experience to diagnose displacement by this method, and to return on the same day to perform corrective laparotomy to find that the abomasum is no longer detectable on the left side, the cow remaining apparently in optimal health thereafter. Again, in other such cases immediate pre-operative confirmatory examination has revealed the viscus still displaced on the left side, but on para-median laparotomy to be "back" on the right side—this conceivably due to positioning the patient prior to operation under chloral anaesthesia. This sort of finding is not uncommon in my experience and it serves to make the operator wonder what the true significance of a low displacement of a mildly tympanitic abomasum to the left side is, and often to make one's client, possibly already sceptical of the diagnosis of a "new" disease, even more so—and often, by now, of the operator's diagnostic ability. Nevertheless, the animals in question have been presented in the first instance as being unwell and thorough clinical examination has failed to reveal any other cause of the malaise.

In the more severely tympanitic type one can find the cow which fits the accepted typical pattern, where spontaneous high-pitched sounds are audible over a defined area of the left anterior abdomen. In this respect it is my opinion that the accepted "abomasal" sound is not necessarily typical of abomasum displacement but typical only of movement of fluid and/or gas in a tympanitic viscus; and it is my belief that such sounds can, and do, occur spontaneously in mild rumenal tympany where the contents are abnormally fluid and movement absent. As a result I find myself further confused when presented with a cow which has moderately severe tympany over the entire left abdomen over which spontaneous high-pitched sounds are audible. Having recently encountered 5 cases of abomasum displacement with gross left abdominal tympany, it now seems extremely difficult to me to decide when one is dealing with rumen or abomasum without recourse to peritoneoscopy or aspiration of fluid from the offending viscus. In all 5 cases where there has been gross tympany of a displaced abomasum over the entire left abdomen there has been considerable organised adhesion between abomasum and parietal peritoneum laterally and between abomasum and rumen medially. In 2 of these cases final diagnosis was simplified by rectal examination when a "doughy" rumen could be clearly palpated medial to an obviously tympanitic abomasum high on the left side.

In conclusion I confess I am somewhat puzzled at times by this condition, by the uncertainty of its relationship to parturition and winter husbandry, and by the variety of clinical findings not always specific to displacement of the abomasum. Many of us will have detected signs of abomasum displacement concurrent with other conditions such as metritis and seemingly (in retrospect) primary acetonaemia, where treatment for these diseases alone has effected apparently complete and permanent return to normality, and yet with alleged abnormality by virtue of a remaining low left-sided abomasum.

Can I even be sure that the presence of a mildly tympanitic abomasum to the left of mid-line is necessarily abnormal, and can some anatomo-physiologist define the possible extent of this organ in normality?

Yours faithfully,
BRIAN MARTIN.

21, Hill Street,
Kilmarnock,
Ayrshire.
August 3rd, 1961.

Sir,—We were very interested to read the excellent article by Pinsent *et al.* on displacement of the bovine abomasum, especially their comments on the para-median method of correction.

Since November, 1960, we have used the method 14 times and would like to offer the following comments. All operations have been performed on farms, using essentially the same technique as that described by Straiton and McIntee. We note that Pinsent *et al.* consider that difficulties of anaesthesia for the practitioner are a serious drawback of the method. While agreeing with this to some extent we now feel that this is far outweighed by the advantages of ease of replacement and spectacular recovery. In the experience of one of us (J. G. H.), none of the other methods of surgical correction are easy to perform by the practitioner, both from the point of view of physical manipulation and identification of organs. Post-operative recovery from flank methods is not in our experience so rapid, and is sometimes unsatisfactory, probably due to trauma following extensive handling of the abdominal cavity. In addition these methods require the attendance of 2 veterinary surgeons whereas we have found the para-median method quite possible to perform by one surgeon and reasonably intelligent farm help.

We would admit to two anaesthetic fatalities. Both were beasts in very poor condition, the case histories suggesting duration of displacement of some months. Operation was attempted as a last resort and the owners suitably warned. Both animals died after the slow intravenous injection of about ¾-1 oz. of chloral hydrate, diluted to a 5 per cent. solution; apparent narcosis so induced developed into anaesthesia and death, before surgical interference was attempted. *Post-mortem* examination revealed in one case total fatty degeneration of the liver; in the other a macroscopically normal liver but approximately one-third the normal size. Both cases had displaced abomasums. These liver findings would indicate poor risks for chloral anaesthesia and we hope to use in the future intravenous type premedicants of the promethazine group together with local field anaesthesia on cows with this clinical picture.

We have not found that post-operative contamina-

tion of the wound occurs any more than with flank methods. One case developed a slight stitch abscess and resolved uneventfully. We make a practice of having the wound covered with clean sheeting reinforced with sacking stretched round the body for some days.

In the first 6 cases of our series we did not attempt to fix the abomasum in position, but have subsequently done so; one unfixed case redisplaced after 5 months' perfect clinical health, was reoperated upon and the organ included in the suture wound and has since maintained clinical health.

Whilst we feel that the clinical manifestations of abomasal displacement have been described by others better qualified than ourselves we would like to add the following observations.

We would agree that faeces consistency usually varies from fluid to normal but have seen 4 constipated cases. Having now some visual experience of the abomasal condition present at operation we think that fluid faeces are to be correlated with an abomasitis; if this is not apparent then faeces are normal or unduly firm depending on appetite and length of illness.

Rumen movements in the long-established case are indeed poor, but we would like to stress that in the recent case the ruminal motility has been usually normal as assessed by frequency of eructation, but the inability to auscultate ruminal sounds suggest the interposition of an organ. We should like to stress the need for long and patient auscultation in many cases before the typical high-pitched tinklings are heard.

In our experience the displacement in the newly-calved cow is rarely associated with ketones in the milk; in fact in the last 20 cases diagnosed by us only 3 have given good positive results to the Rothera test. We feel that the Rothera test is more a guide to the state of body metabolism than a specific aid to any diagnosis.

A small clinical point is the observation that many cases show a marked tendency to lie on the right side when resting, presumably thereby relieving discomfort from the displaced organ.

In conclusion we feel that for the practitioner the paramedian method of correction is, despite anaesthetic difficulties, the method of choice.

Yours faithfully,
J. G. HOLLANDS,
J. W. PANKHURST.

Overdale,
Newmarket Street,
Buxton.
August 6th, 1961.

Sir,—With reference to the article on "Displacement of the Bovine Abomasum" by Messrs. P. J. N. Pinsent, P. A. Neal and H. E. Ritchie (*Vet. Rec.* **73**, 729), I feel that their conclusions, as to the most satisfactory method of surgical treatment, do not correspond with my experience.

I have operated on 11 cases over the past 2 years; 10 by right flank approach, and 1 by left flank. In my experience the right flank approach has proved to be both satisfactory and, under field conditions, a fairly quick procedure.

The method followed is that, under paravertebral anaesthesia, an incision is made below the sublumbar fossa parallel to, and about 2 inches behind, the last rib. On entering the abdominal cavity, the left hand is passed over the dorsal sac of the rumen and round to the left side of the rumen. The abomasum, if displaced, can immediately be felt as a balloon-like organ. If it is grossly distended with gas, the organ is first deflated by trocharising using a large-bore needle attached to a length of rubber tubing. The arm of the operator is then worked downwards over the rear of the rumen on to the floor of the abdomen still keeping the palm of the hand on the abomasum. The abomasum is then pushed downwards rhythmically so gradually gaining momentum then, when it is moving well, it is given an extra push to establish it completely under the rumen. The abomasum is then anchored to the right abdominal wall in the usual manner.

No doubt I have been lucky in finding cases with only slight adhesions to the left abdominal wall, but in any case the animal may always be opened on the left side if the abomasum is found greatly adhesed; so far this has not been necessary. I make a point of trying to have the animal starved for 24 to 36 hours before the operation, which makes an appreciable gap between the rumen and the abdominal floor, and assists the return of the abomasum.

All cases so far operated upon have made a good recovery. In conclusion I feel that the technique outlined above is quite satisfactory, and the bilateral approach is unnecessary in the majority of cases.

Yours faithfully,
V. G. GALE.

Steep,
Oakridge Lane,
Sidcot,
Winscombe,
Somerset.
August 3rd, 1961.

Messrs. Bayer Products

Sir,—By the time this letter appears in THE RECORD, Messrs. Bayer will have severed their long association with the veterinary profession. It is surely to be regretted that a firm which has supported us by adopting a strictly ethical policy for so many years should find now that it is no longer economical to do business with us—a decision due in no small measure to lack of support from veterinary surgeons many of whom have frequently voiced disapproval of non-ethical trading by other firms.

I, and I am sure many members, would like to thank Messrs. Bayer for their much appreciated support in the past, and to express regret that they will no longer be "calling."

Yours faithfully,
DOUGLAS B. STEEL.

48, Albany Drive,
Lanark.
July 31st, 1961.